CLAIMS

1.   A method for shading 3-dimensional computer graphics images comprising the steps of:

subdividing a display on which an image is to be viewed into a plurality of rectangular areas;

for each rectangular area deriving a list of objects in the image which may be visible in that rectangular area;

using the list of objects to determine how the rectangular area should be shaded for display;

characterized in that the step of deriving a list of objects comprises the steps of:

determining maximum and minimum values for each object in x and y directions;

determining a set of sampling points from the maximum and minimum values;

determining whether or not a bounding box surrounding the object covers any of the sampling points; and

adding or rejecting the object from the list in dependence on the result of the determination.

2.   A method according to claim 1 including the step of determining whether or not the separation of the sampling points in the x and y directions exceeds the resolution of the display; and adding or rejecting the object from the list in dependence on the result of the determination.

3.   A method according to claim 2 in which the resolution of the display comprises the pixel separation of the display.

4.   A method according to claim 1, 2 or 3 including the step of testing each sampling point against each edge of the object; determining whether the object covers any sampling point from the testing step, and adding or rejecting the object from the list in dependence on the result of the determination.

5.   A method according to any preceding claim including the step of deriving a bounding box for an object to be displayed, and for each object selecting only those rectangular areas which fall at least partially within the bounding box when determining whether or not that object is to be added to the list for a rectangular area.

6.   A method for shading 3-dimensional computer graphics images comprising the steps of:
        subdividing a display for an image into a plurality of rectangular areas;
        for each object in the image determining a bounding box of rectangular areas into which the object may fall;
        testing edge information from each object against a sample point in each rectangular area to determine whether or not the object falls into each of the rectangular areas in the bounding box;
        inserting the object in an object list for a rectangular area in dependence on the result of the determination; and
        characterized in that the step of testing edge information includes the step of shifting the edge information by a predetermined amount in dependence on the orientation of each edge.

7.   A method according to claim 6 in which the step of shifting edge information comprises shifting by either the vertical or horizontal dimension of a rectangular area.

8.   A method according to claim 7 in which the shifting step is performed using a floating point calculation.

9.   A method according to claim 6, 7 or 8 in which the shifting step is performed with a safety margin whereby objects will be included in object lists for a rectangular area if the edge information falls close to a sampling point.

10.   Apparatus for shading a three-dimensional computer graphics image comprising:
        means for subdividing a display on which the image is to be viewed into a plurality of rectangular areas;

means for deriving for each rectangular area a list of objects in the image which may be visible in that rectangular area;

means for determining how the rectangular area should be shaded for display by using the list of objects;

characterised in that the means for deriving a list of object comprises;

means for determining maximum and minimum values for each object in X and Y directions;

means for determining a set of sampling points from the maximum and minimum values;

means for determining whether or not a bounding box surrounding the object covers any of the sampling points; and

means for adding or rejecting the object from the list in dependence on the result of the determination.

11.   The apparatus according to claim 10 including means for determining whether or not the separation of the sampling points in the X and Y directions exceeds the resolution of the display; and means for adding or rejecting the object from the list in dependence on the result of the determination.

12.   Apparatus according to claim 11 in which the resolution of the display comprises the pixel separation of the display.

13.   Apparatus according to claim 10, 11 or 12 including means for testing each sampling point against each edge of the object; means for determining from the test performed by the testing means whether or not the object covers any sampling point; and means for adding or rejecting the object from the list in dependence on the result of the determination.

14.   Apparatus according to any claims 10 to 13 including means for deriving a bounding box for an object to be displayed, and means for selecting for each object only those rectangular areas which fall at least partially within the bounding box when determining whether or not that object is to be added to the list for a rectangular area.

15. Apparatus for shading a three-dimensional computer graphics image comprising:

means for subdividing a display for an image into a plurality of rectangular areas;

means for determining for each object in the image a bounding box of rectangular areas into which the object may fall;

means for testing edge information from each object against a sample point in each rectangular to determine whether or not the object falls into each of the rectangular areas in the bounding box;

means for inserting the object in an object list for a rectangular area in dependence on the result of the determination;

characterised in that the means for testing edge information includes means for shifting the edge information by a predetermined amount in dependence on the orientation of each edge.

16. An apparatus according to claim 15 in which the means for shifting edge information comprises means for shifting by either the vertical or horizontal dimension of a rectangular area.

17. An apparatus according to claim 16 in which the shifting means uses a floating point calculation.

18. Apparatus according to claim 6, 7 or 8 in which the shifting means uses a safety margin whereby objects will be included in object lists for a rectangular area if the edge information falls close to a sampling point.

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